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EXAMINER	
LIU, LI	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/533,664	Applicant(s) ROHDE, HARALD	
	Examiner LI LIU	**Art Unit** 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 31 July 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 8-14,18 and 23-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 8-14,18 and 23-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 May 2005 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/31/2008 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claim 8-14, 18 and 23-27 have been considered but are moot in view of the new ground(s) of rejection.

Specification

3. The disclosure is objected to because of the following informalities:

1). Page 7, line 28, “a factor of 1-R)” should be changed to "a factor of (1-R)".

2). Page 8, line 21, “therefore 1-R)*(1-R)” should be changed to " therefore (1-R)*(1-R)”.

3). Page 9, line 19, “ $\frac{1}{2}-\frac{1}{2*e^2})$” should be changed to " $(\frac{1}{2}-\frac{1}{2*e^2})$”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Mahgerefteh et al (US 6,026,841).

1). With regard to claim 23, Mahgerefteh et al discloses a receiver (e.g., Figure 14) for an angle-modulated optical signal (the phase modulated signals from SOA 21 of Figure 14) having a light frequency, the receiver comprising:

an optical resonator (the discriminator 34 in Figure 14) fed by an angle-modulated signal (phase-modulated signal, column 5 line 14-16);

an optical uncoupling mechanism (the circulator 35 in Figure 14) upstream of the optical resonator for light reflected from the optical resonator;

an opto-electric converter (the receiver 24 in Figure 14) arranged downstream of the optical uncoupling mechanism;

the optical resonator has a resonance frequency adjusted to the angle-modulated optical signal associated with the light frequency for determining phase information of the optical signal (column 5, line 7-53, the resonator or discriminator is adjusted to resonate with one of the wavelengths $\lambda 1$=1546 nm and $\lambda 2$ =1535.3 nm, the resonator/discriminator determine the phase information in the optical field and then convert the intensity- and phase-modulated signal to an enhanced intensity-modulated

signal, column 6, claim 1).

2). With regard to claim 24, Mahgerefteh et al discloses wherein the optical resonator is a Fabry-Perot resonator (column 5, line 54-56, and column 6 claim 9).

3). With regard to claim 25, Mahgerefteh et al discloses wherein the optical uncoupling mechanism comprises a circulator (the circulator 35 in Figure 14, column 5, line 41-44) arranged upstream of the optical resonator, and wherein an output of the circulator is connected to the opto-electric converter (Figure 14, the output from the circulator 35 is connected the receiver 24).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahgerefteh et al as applied to claim 23 above, and further in view of Rohde et al (Rohde et al: "Optical decay from a Fabry-Perot cavity faster than the decay time", J. Opt. Soc. Am. B, Vol. 19, No. 6, June 2002, pages 1425-1429).

Mahgerefteh et al discloses all of the subject matter as applied to claim 23 above. But, Mahgerefteh et al does not expressly disclose wherein the optical uncoupling mechanism comprises a polarization beam splitter with a following polarization plate so that the angle-modulated optical signal and the reflected light have

different polarizations which can be separated by the polarization beam splitter; and the further comprising a second opto-electric converter arranged downstream of the optical resonator for increasing sensitivity.

However, Rohde et al, in the same field of endeavor, teaches a receiver for an angle-modulated optical signal (Figure 1, page 1426), wherein the optical coupling-out device (PBS2 and quarter-wave plate $\lambda/2$ in Figure 1) comprises a polarization beam splitter (PBS2 in Figure 1) with a following polarization plate (quarter-wave plate $\lambda/2$ in Figure 1) so that the angle-modulated optical signal and the reflected light have different polarizations which can be separated by the polarization beam splitter (because of the quarter-wave plate, the polarization of the reflected signal is rotated 90 degree with respective to the input angle-modulated signal, so that the reflected signal is passed through the PBS2 again and received by the PD2); and a second opto-electric converter (the PD1 in Figure 1, page 1426, right column) arranged downstream of the optical resonator for increasing sensitivity (page 1427-1428, two photodiodes are used to measure the changes of the signal, the sensitivity of the device is increased).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the polarization beam splitter with polarization plate and the second photodiode as taught by Rohde et al to the system of Mahgerefteh et al so that one more choice can be used in the system to separate the reflected signals and by using the two photodiodes both the transmitted signal and reflected can be monitored and processed and then the system will have higher sensitivity to frequency/phase variations and better noise processing/cancellation.

8. Claims 8-11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahgerefteh et al (US 6,026,841).

1). With regard to claim 8, Mahgerefteh et al discloses a receiver (e.g., Figure 14) for an angle-modulated optical signal (the phase modulated signals from SOA 21 of Figure 14) having an associated light frequency and an associated bit rate (e.g., the NRZ/RZ data signal has a specific frequency, and the NRZ or RZ data signal is associates with a bit rate), comprising:

an optical resonator (the discriminator 34 in Figure 14) tuned to the frequency of the optical signal (column 5, line 7-53, the resonator or discriminator is adjusted to resonate with one of the two wavelengths $\lambda 1$ = 1546 nm $\lambda 2$ = 1535.3 nm);

an optical coupling-out device (the circulator 35 in Figure 14) preceding the optical resonator and designed for injecting the optical signal into the optical resonator and for coupling out reflected light from the optical resonator (Figure 14, the circulator injects the optical signal into the optical resonator 34 and couples out reflected light from the optical resonator and sends the reflected signal to the receiver 24); and

an opto-electrical transducer (the receiver 24 in Figure 14) receiving the reflected light and converting it into an amplitude-modulated electrical signal according to phase information of the optical signal (the resonator/discriminator determine the phase information in the optical field and then convert the intensity- and phase-modulated signal to an enhanced intensity-modulated signal, then the receiver converts the

amplitude-modulated optical signal into an amplitude-modulated electrical signal, column 6, claim 1).

But, Mahgerefteh et al does not expressly disclose that the resonator is tuned to a storage time of approximately half of one bit duration.

Mahgerefteh et al teaches that the discriminator or resonator can be formed from Fabry-Perot filter. It is well known in the art that the storage time of a F-P resonator is related to the reflectivity R and length L of the F-P resonator: $\tau = L/((1-R)*c) = 1/(2*\Delta\nu*\pi)$, where c is the speed of light, and $\Delta\nu$ is the half-power beamwidth of the resonance or FWHM of the F-P passband. Mahgereftech et al's system is fully capable of tuning the F-P resonator to a storage time of approximately half of one bit duration by selecting/adjusting the R and L of the resonator. Although Mahgerefteh et al doesn't specifically disclose the resonator tuned to a storage time of approximately half of one bit duration, such limitation are merely a matter of design choice and would have been obvious in the system of Mahgerefteh et al. Mahgerefteh et al teaches that the F-P filter is used to pass one frequency/phase component and reject another frequency/phase component so that the phase- and intensity-modulated signal can be converted into intensity modulated signal. The limitation in claim 8 does not define a patentably distinct invention over that in Mahgerefteh et al since both the invention as a whole and Mahgerefteh et al are directed to use the F-P resonator to discriminate the frequency/phase information from the transmitted light and convert the frequency/phase information into an amplitude-modulated signal. The exact value of the storage time of a F-P resonator is inconsequential for the invention as a whole and presents no new or

unexpected results, so long as the frequency/phase information is successfully determined and the frequency/phase modulated signal is successfully converted into amplitude-modulated signal. Therefore, to have a storage time of approximately half of one bit duration or other time values in Mahgerefteh et al would have been a matter of obvious design choice to one of ordinary skill in the art.

2). With regard to claim 9, Mahgerefteh et al discloses all of the subject matter as applied to claim 8 above. And Mahgerefteh et al further discloses wherein the optical resonator is a Fabry-Perot resonator (column 5, line 54-56, and column 6 claim 9).

3). With regard to claim 10, Mahgerefteh et al discloses all of the subject matter as applied to claim 8 above. And Mahgerefteh et al further discloses wherein the optical coupling-out device comprises a circulator connected preceding the optical resonator (the circulator 35 in Figure 14, column 5, line 41-44) and whose output is connected to the opto-electric transducer (Figure 14, the output from the circulator 35 is connected the receiver 24).

4). With regard to claim 11, Mahgerefteh et al discloses all of the subject matter as applied to claims 8 and 9 above. And Mahgerefteh et al further discloses wherein the optical coupling-out device comprises a circulator connected preceding the optical resonator (the circulator 35 in Figure 14, column 5, line 41-44) and whose output is connected to the opto-electric transducer (Figure 14, the output from the circulator 35 is connected the receiver 24).

5). With regard to claim 18, Mahgerefteh et al discloses all of the subject matter as applied to claim 8 above. And Mahgerefteh et al further discloses the receiver

comprises a coding for assigning a phase variation by the light reflected and as the case may be transmitted by the optical resonator (column 5, line 7-53, column 6, claim 1, the optical signals inputted to the resonator/discriminator are phase modulated, and the resonator/discriminator is adjusted to resonate with one of the wavelengths $\lambda 1$=1546 nm and $\lambda 2$ =1535.3 nm, the resonator/discriminator determines the phase information in the optical field, and passes/transmittes one frequency/phase component and reflects another frequency/phase component, and then convert the intensity- and phase-modulated signals into an enhanced intensity-modulated signals).

9. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahgerefteh et al as applied to claims 8 and 9 above, and further in view of Rohde et al (Rohde et al: “Optical decay from a Fabry-Perot cavity faster than the decay time”, J. Opt. Soc. Am. B, Vol. 19, No. 6, June 2002, pages 1425-1429).

Mahgerefteh et al discloses all of the subject matter as applied to claims 8 and 9 above. But, Mahgerefteh et al does not expressly disclose wherein the optical coupling-out device comprises a polarization beam splitter with a following polarization plate so that the angle-modulated optical signal and the reflected light have different polarizations which can be separated by the polarization beam splitter; and wherein a second opto- electric transducer is arranged downstream of the optical resonator receiving non-reflected light and outputting a complementary signal to increase the sensitivity of the receiver.

However, Rohde et al, in the same field of endeavor, teaches a receiver for an angle-modulated optical signal (Figure 1, page 1426), wherein the optical coupling-out

device (PBS2 and quarter-wave plate $\lambda/2$ in Figure 1) comprises a polarization beam splitter (PBS2 in Figure 1) with a following polarization plate (quarter-wave plate $\lambda/2$ in Figure 1) so that the angle-modulated optical signal and the reflected light have different polarizations which can be separated by the polarization beam splitter (because of the quarter-wave plate, the polarization of the reflected signal is rotated 90 degree with respective to the input angle-modulated signal, so that the reflected signal is passed through the PBS2 again and received by the PD2); and a second opto-electric converter (the PD1 in Figure 1, page 1426, right column) arranged downstream of the optical resonator for increasing sensitivity (page 1427-1428, two photodiodes are used to measure the changes of the signal, the sensitivity of the device is increased).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the polarization beam splitter with polarization plate and the second photodiode as taught by Rohde et al to the system of Mahgerefteh et al so that one more choice can be used in the system to separate the reflected signals and by using the two photodiodes both the transmitted signal and reflected can be monitored and processed and then the system will have higher sensitivity to frequency/phase variations and better noise processing/cancellation.

10. Claims 8, 9, 12-14, 18 and 23, 24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 5,027,435) in view of Bava et al (Bava et al: "Frequency-Noise Sensitivity and Amplitude-Noise Immunity of Discriminators Based on Fringe-Side Fabry-Perot Cavities", IEEE Transactions on Ultrasonic, Ferroelectrics, and Frequency Control, Vol. 49, No. 8, August 2002, pages 1150-1158).

1). With regard to claim 8, Chraplyvy et al discloses a receiver (e.g., Figure 6) for an angle-modulated optical signal (e.g., Figure 7, frequency modulated signal or FSK modulation) having an associated light frequency and an associated bit rate (column 12 line 36-39, the bit rate 2 Gb/s, 4 Gb/s or 8 Gb/s etc.), comprising:

an optical resonator (Fabry-Perot Interferometer 626 in Figure 6) tuned to the frequency of the optical signal (Figure 7);

an opto-electrical transducer (Detection Receiver 628 in Figure 6) receiving the transmitted light and converting it into an amplitude-modulated electrical signal according to phase information of the optical signal (the FSK signals are converted into amplitude-modulated ASK signals, column 11 line 42 to column 12 line 9, and column 13 lines 13-30).

But, Chraplyvy et al teaches to detect the transmitted signals. Chraplyvy et al does not expressly disclose: (A) an optical coupling-out device preceding the optical resonator and designed for injecting the optical signal into the optical resonator and for coupling out reflected light from the optical resonator; and the opto-electrical transducer receiving reflected light; and (B) the optical resonator tuned to a storage time of approximately half of one bit duration.

With regarding item (A), Bava et al teaches a receiver (Figure 1c) for an angle-modulated optical signal, in which an optical coupling-out device (the PBS and FR in Figure 1c) preceding the optical resonator (Fabry-Perot resonator in Figure 1c) and designed for injecting the optical signal into the optical resonator and for coupling out reflected light from the optical resonator (the PBS/FR injects the optical signal into the optical resonator and couples out reflected light from the optical resonator and sends the reflected signal $E_R(t)$ into the first photodiode PD_R); and the opto-electrical transducer (the photodiode PD_R in Figure 1c) receiving reflected light (the reflected signal $E_R(t)$ are received by the PD_R).

Bava et al teaches that using both reflection and transmission, the device has a higher sensitivity to frequency variations ad a better rejection of amplitude noise (page 1151 left column).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to apply a coupling device and detection of reflected signal as taught by Bava et al to the system of Chraplyvy et al so that a receiver with a higher sensitivity can be obtained.

With regarding to item (B), Chraplyvy et al and Bava et al teach that the Fabry-Perot resonator is used to convert the angle modulated signal into amplitude-modulated signal. It is well known in the art that the storage time of a F-P resonator is related to the reflectivity R and length L of the F-P resonator: $\tau = L/((1-R)^*c) = 1/(2^*\Delta\nu*\pi)$, where c is the speed of light, and $\Delta\nu$ is the half-power beamwidth of the resonance or FWHM of the F-P passband. Chraplyvy et al and Bava et al's system is fully capable of

setting/adjusting the F-P resonator to a storage time of approximately half of one bit duration by selecting/adjusting the R and L of the resonator. Although Chraplyvy et al and Bava et al do not specifically disclose the resonator tuned to a storage time of approximately half of one bit duration, such limitation are merely a matter of design choice and would have been obvious in the system of Chraplyvy et al and Bava et al. Chraplyvy et al and Bava et al teach that the F-P resonator is used to pass one frequency/phase component and reject another frequency/phase component so that the angle-modulated signal can be converted into amplitude modulated signal. The limitation in claim 8 does not define a patentably distinct invention over that in Chraplyvy et al and Bava et al since both the invention as a whole and Chraplyvy et al and Bava et al are directed to use the F-P resonator to discriminate the frequency/phase information from the transmitted light and convert the frequency/phase information into an amplitude-modulated signal. The exact value of the storage time of a F-P resonator is inconsequential for the invention as a whole and presents no new or unexpected results, so long as the frequency/phase information is successfully determined and the frequency/phase modulated signal is successfully converted into amplitude-modulated signal. Therefore, to have a storage time of approximately half of one bit duration or other time values in Chraplyvy et al and Bava et al would have been a matter of obvious design choice to one of ordinary skill in the art.

2). With regard to claim 9, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claim 8 above. And Chraplyvy et al and Bava et al further

disclose wherein the optical resonator is a Fabry-Perot resonator (e.g., F-P in Figure 6 of Chraplyvy et al, and Figure 1 in Bava et al).

3). With regard to claims 12 and 13, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claims 8 and 9 above. And Chraplyvy et al and Bava et al further disclose wherein the optical coupling-out device comprises a polarization beam splitter (PBS in Figure 1c of Bava et al) with a following polarization plate (Faraday rotator FR in Figure 1c of Bava et al) so that the angle-modulated optical signal and the reflected light have different polarizations which can be separated by the polarization beam splitter (because of the FR, the polarization of the reflected signal $E_R(t)$ is rotated 90 degree with respective to the input angle-modulated signal E(t), so that the reflected signal is reflected by PBS toward the PD_R).

4). With regard to claim 14, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claim 8 above. And Chraplyvy et al and Bava et al further disclose wherein a second opto- electric transducer (e.g., PD_T in Figure 1c of Bava et al) is arranged downstream of the optical resonator receiving non-reflected light and outputting a complementary signal (the signal $V_T(t)$ in Figure 1c of Bava et al) to increase the sensitivity of the receiver.

5). With regard to claim 18, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claim 8 above. And Chraplyvy et al and Bava et al further disclose the receiver comprising a coding for assigning a phase variation by the light reflected and as the case may be transmitted by the optical resonator (e.g., Chraplyvy et al: the FSK signals are converted into amplitude-modulated ASK signals, column 11

line 42 to column 12 line 9, and Figure 7, column 13 line 3-30, logic “0” and “1” are coded on to different "tone" or frequency, the F-P resonator transmits one frequency component and reflects another component).

6). With regard to claim 23, Chraplyvy et al discloses a receiver (e.g., Figure 6) for an angle-modulated optical signal (e.g., Figure 7, frequency modulated signal or FSK modulation) having a light frequency, the receiver comprising:

an optical resonator (Fabry-Perot Interferometer 626 in Figure 6) fed by the angle-modulated optical signal;

an opto-electric converter (Detection Receiver 628 in Figure 6) arranged downstream of the optical resonator, wherein

the optical resonator has a resonance frequency (Figure 7) adjusted to the angle-modulated optical signal associated with_the light frequency for determining a phase information of the optical signal (the FSK signals are converted into amplitude-modulated ASK signals, column 11 line 42 to column 12 line 9, and column 13 lines 13-30, the phase information in the optical field is determined in the optical resonator and converted into amplitude-modulated signal).

But, Chraplyvy et al teaches to detect the transmitted signals. Chraplyvy et al does not expressly disclose: an optical uncoupling mechanism arranged upstream of the optical resonator for light reflected from the optical resonator; and the opto-electric converter arranged downstream of the optical uncoupling mechanism.

However, Bava et al teaches a receiver (Figure 1c) for an angle-modulated optical signal, in which an optical uncoupling mechanism (the PBS and FR in Figure 1c)

arranged upstream of the optical resonator for light reflected from the optical resonator (Fabry-Perot resonator in Figure 1c) and for coupling out reflected light from the optical resonator (the PBS/FR injects the optical signal into the optical resonator and couples out reflected light from the optical resonator and sends the reflected signal $E_R(t)$ into the PD_R); and the opto-electric converter (the first photodiode PD_R in Figure 1c) arranged downstream of the optical uncoupling mechanism (the reflected signal $E_R(t)$ are received by the PD_R).

Bava et al teaches that using both reflection and transmission, the device has a higher sensitivity to frequency variations ad a better rejection of amplitude noise (page 1151 left column).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to apply a coupling device and detection of reflected signal as taught by Bava et al to the system of Chraplyvy et al so that a receiver with a higher sensitivity can be obtained.

7). With regard to claim 24, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claim 23 above. And Chraplyvy et al and Bava et al further disclose wherein the optical resonator is a Fabry-Perot resonator (e.g., F-P in Figure 16 of Chraplyvy et al, and Figure 1 in Bava et al).

8). With regard to claim 26, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claim 23 above. And Chraplyvy et al and Bava et al further disclose wherein the optical uncoupling mechanism comprises a polarization beam splitter (PBS in Figure 1c of Bava et al) with a following polarization plate (Faraday

rotator FR in Figure 1c of Bava et al) so that the angle-modulated optical signal and the reflected light have different polarizations which can be separated by the polarization beam splitter (because of the FR, the polarization of the reflected signal $E_R(t)$ is rotated 90 degree with respective to the input angle-modulated signal E(t), so that the reflected signal is reflected by PBS toward the PD_R).

9). With regard to claim 27, Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claim 23 above. And Chraplyvy et al and Bava et al further disclose a second opto-electric converter (e.g., PD_T in Figure 1c of Bava et al) arranged downstream of the optical resonator for increasing sensitivity.

11. Claims 10, 11 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al and Bava et al as applied to claims 8, 9 and 23 above, and in further view of Li et al (US 2001/0038481).

Chraplyvy et al and Bava et al discloses all of the subject matter as applied to claims 8, 9 and 23 above. Chraplyvy et al and Bava et al teaches that the PBS/FR is connected preceding the optical resonator and whose output is connected to the opto-electric transducer (Figure 1c of Bala et al). But, Chraplyvy et al and Bava et al do not expressly disclose that a circulator is arranged upstream of the optical resonator..

However, to use an optical circulator connected preceding an optical resonator is well known in the art, Li et al teaches such arrangement (Figure 5F) in which the optical circulator (18 in Figure 5F) connected preceding the optical resonator (the F-P filter 74 in Figure 5F) and whose output (e.g., 32 in Figure 5F) is connected to an O/E converter.

Li et al teaches a simple coupling device. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use a circulator as taught by Li et al to the system of Chraplyvy et al and Bala et al so that a reflected signal from the optical resonator can be coupled out by a circulator and sent to an O/E converter, and then a simpler structure and higher sensitivity receiver can be obtained.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **LI LIU** whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. L./
Examiner, Art Unit 2613
November 2, 2008

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613